**What is claimed is:**

1. An apparatus for thermally processing a plurality of substrates held in a carrier, the apparatus comprising:

a process chamber having a top wall, a side wall and a bottom wall including a pedestal;

a heating source having a plurality of heating elements to thermally process the plurality of substrates, each of the plurality of heating elements proximal to at least one of the top wall, the side wall and the bottom wall of the process chamber, and at least one of the plurality of heating elements in the pedestal; and

a removable thermal shield adapted to be inserted between the at least one of the plurality of heating elements in the pedestal and the substrates held the carrier.

2. An apparatus according to claim 1, wherein the thermal shield comprises a first surface facing the substrates held the carrier, the first surface having an absorptivity of at least 0.5.

3. An apparatus according to claim 2, wherein the thermal shield comprises a second surface facing the pedestal, the second surface having a reflectivity of at least 0.8.

4. An apparatus according to claim 3, wherein the thermal shield further comprises a cooling channel between the first and second surfaces.

5. An apparatus according to claim 1, wherein the thermal shield comprises a reflective surface and a absorptive surface comprising materials selected from the group consisting of:

Stainless Steel

Quartz

Aluminum; and

Silicon Carbide.

6. An apparatus according to claim 1, wherein the thermal shield comprises stainless steel having a polished reflective surface facing the pedestal, and a non-polished absorptive surface facing the substrates on the carrier.

7. An apparatus for thermally processing a plurality of substrates, comprising:

a thermal process chamber;

a pedestal having an open position with respect to the process chamber, a closed position with respect to the process chamber, and a varying position between the open and closed positions;

a distributed heating source for establishing substantially uniform heat throughout a process zone within the process chamber, with the pedestal in the closed position;

a thermal shield; and

a positioner coupled to the thermal shield for removably positioning the thermal shield between the pedestal and the process chamber at least while the pedestal is in the varying position.

8. An apparatus for thermally processing a plurality of substrates held in a carrier, the apparatus comprising:

a process chamber having a top wall, a side wall and a bottom wall;

a heating source having a plurality of heating elements to thermally process the plurality of substrates, each of the plurality of heating elements proximal to at least one of the top wall, the side wall and the bottom wall of the process chamber; and

a magnetically coupled repositioning system that repositions the carrier with the plurality of substrates held therein during thermal processing of the plurality of substrates, wherein the mechanical energy to reposition the carrier is magnetically coupled through the bottom wall to the carrier.

9. An apparatus according to claim 8, wherein the bottom wall includes a movable pedestal having at least one of the plurality of heating elements therein, and wherein the mechanical energy to reposition the carrier is magnetically coupled through the movable pedestal substantially without moving the at least one of the plurality of heating elements in the movable pedestal.

10. An apparatus according to claim 8, wherein the magnetically coupled repositioning system is adapted to rotate the carrier with the plurality of substrates held therein during thermal processing of the plurality of substrates.

11. An apparatus according to claim 10, wherein the magnetically coupled repositioning system is adapted to rotate the carrier at a speed of from about 0.1 to about 10 revolutions per minute (RPM).

12. An apparatus according to claim 8, wherein the magnetically coupled repositioning system is adapted to oscillate the carrier.

13. An apparatus according to claim 8, wherein the carrier comprises a magnetic member to which the mechanical energy to reposition the carrier is magnetically coupled through the bottom wall.

14. An apparatus according to claim 8, further comprising a support on which the carrier is positioned in the process chamber, and wherein the support comprises a magnetic member to which the mechanical energy to reposition the carrier is magnetically coupled through the bottom wall.

15. An apparatus according to claim 8, wherein the mechanical energy to reposition the carrier is magnetically coupled through the bottom wall to the carrier without the use of a movable feedthrough into the process chamber

16. An apparatus for thermally processing a plurality of substrates, comprising:

a process chamber enclosure defining a thermal process chamber within;

a carrier support disposed in the process chamber for supporting a carrier containing a plurality of substrates during thermal processing;

a distributed heating source for establishing substantially uniform heat throughout a process zone within the process chamber during thermal processing; and

a repositioning system magnetically coupled to the carrier support through the process chamber enclosure for repositioning the carrier support during thermal processing, wherein the substrates are repositioned in the process zone.

17. An apparatus for thermally processing a plurality of substrates held in a carrier, the apparatus comprising:

a process chamber having a top wall, a side wall and a bottom wall including a movable pedestal adapted to be lowered and raised to enable the carrier with the plurality of substrates held therein to be inserted into and removed from the process chamber;

a heating source having a plurality of heating elements proximal to the process chamber to thermally process the plurality of substrates, at least one of the plurality of heating elements in the movable pedestal; and

a shutter adapted to be moved into place above the carrier to isolate the process chamber when the pedestal is in a lowered position.

18. An apparatus according to claim 17, further comprising a pumping system to evacuate the process chamber prior to processing, and wherein the shutter is adapted to seal with the process chamber to enable the pumping system to evacuate the process chamber when the pedestal is in the lowered position.

19. An apparatus according to claim 17, wherein the shutter comprises a cooling channel.

20. An apparatus according to claim 17, wherein the shutter is adapted to be swung into place above the carrier when the pedestal is in a lowered position, and raised to isolate the process chamber.

21. An apparatus according to claim 17, wherein the shutter is adapted to be slid into place above the carrier when the pedestal is in a lowered position, and raised to isolate the process chamber.

22. An apparatus for thermally processing a plurality of substrates, comprising:

a process chamber enclosure defining a process chamber within;

a shutter disposed upon the process chamber enclosure;

a pedestal having an open position with respect to the process chamber, a closed position with respect to the process chamber, and a varying position between the open and closed positions, the pedestal being movable through the shutter;

a distributed heating source for establishing substantially uniform heat throughout a process zone within the process chamber with the pedestal in the closed position; and

an actuator coupled to the shutter for opening the shutter while the pedestal is in the closed and varying positions, and for closing the shutter when the pedestal is in the open position.

23. An apparatus for thermally processing a plurality of substrates held in a carrier, the apparatus comprising:

a process chamber having a top wall, a side wall and a bottom wall;

a heating source having a plurality of heating elements to thermally process the plurality of substrates, each of the plurality of heating elements proximal to at least one of the top wall, the side wall and the bottom wall of the process chamber;

a liner separating the carrier with the plurality of substrates held therein from the top wall and the side wall of the process chamber; and

a cross-flow injection system to direct flow of a fluid across surfaces of each of the plurality of substrates, the cross-flow injection system including:

a cross-flow injector having a plurality of injection ports positioned relative to the plurality of substrates held in the carrier, and through which a fluid is introduced on one side of the plurality of substrates; and

a plurality of exhaust ports in the liner, the exhaust ports positioned relative to the plurality of substrates held in the carrier to cause the fluid to flow directly across surfaces of the plurality of substrates.

24. An apparatus according to claim 23, wherein the plurality of injection ports are positioned to direct flow of the fluid against the liner prior to the fluid flowing across the surfaces of each of the plurality of substrates.

25. An apparatus according to claim 23, wherein the cross-flow injector comprises a first injector and a second injector, each having a plurality of injection ports positioned relative to the plurality of substrates held in the carrier.

26. An apparatus according to claim 25, wherein the plurality of injection ports of the first injector and the second injector are positioned to direct flow of the

fluid against the liner prior to the fluid flowing across the surfaces of each of the plurality of substrates,

whereby reactants in the fluid introduced by the first injector and the second injector are mixed prior to the fluid flowing across the surfaces of each of the plurality of substrates.

27. An apparatus according to claim 25, wherein the plurality of injection ports of the first injector and the second injector are positioned relative to one another to direct flow of the fluid from the plurality of injection ports of the first injector prior toward the second injector, and to direct flow of the fluid from the plurality of injection ports of the second injector prior toward the first injector,

whereby reactants in the fluid introduced by the first injector and the second injector are mixed prior to the fluid flowing across the surfaces of each of the plurality of substrates.

28. An apparatus for thermally processing a plurality of substrates, comprising:

a process chamber enclosure defining a thermal process chamber within;

a distributed heating source for establishing substantially uniform heat throughout a process zone within the process chamber during thermal processing;

a gas injector having a plurality of gas injector ports generally disposed in proximity to the processing zone; and

a gas exhaust having a plurality of gas exhaust ports generally disposed in proximity to the processing zone, in opposition to the gas injection ports across the processing zone.

29. A method for thermally processing a plurality of substrates held on a carrier within a process zone of a process chamber having a top wall, a side wall, and a bottom wall, the method comprising steps of:

heating the process zone from a heat source having a plurality of heating elements, each of the plurality of heating elements disposed proximate to at least one of the top wall, the side wall and the bottom wall of the process chamber;

inserting the carrier with the plurality of substrates held therein into the process zone; and

introducing a fluid on one side of the plurality of substrates through a plurality of injection ports positioned relative to the plurality of substrates held in the carrier; and

flowing the fluid across surfaces of the plurality of substrates from the plurality of injection ports to a plurality of exhaust ports in a liner separating the carrier with the plurality of substrates held therein from the top wall and the side wall of the process chamber, the exhaust ports positioned relative to the plurality of substrates held in the carrier.

30. A method according to claim 29, wherein the bottom of the process chamber comprises a pedestal having at least one of the plurality of heating elements therein, the pedestal adapted to be lowered and raised to enable the batch of substrates in the carrier to be inserted into the process chamber, and wherein the step of inserting the carrier with the plurality of substrates held therein into the process zone comprises the steps of:

positioning the carrier on the pedestal; and

raising the pedestal to insert the carrier with the plurality of substrates held therein into the process zone.

31. A method according to claim 30, wherein the step of raising the pedestal to insert the carrier with the plurality of substrates held therein into the process zone comprises the step of simultaneously preheating the plurality of substrates in the carrier to an intermediate temperature.

32. A method according to claim 30, wherein the pedestal comprises a removable shield capable of reflecting heat from the at least one of the plurality of heating elements back to the pedestal to maintain the temperature thereof, and wherein the method further comprises the step of prior to inserting the carrier with the plurality of substrates held therein into the process chamber moving the removable shield into a position to reflect heat from the at least one of the plurality of heating elements back to the pedestal to maintain the temperature thereof.

33. A method according to claim 30, wherein the apparatus further comprises a shutter adapted to be moved into place above the carrier to isolate the process chamber when the pedestal is in a lowered position, and wherein the method further comprises the step of moving the shutter carrier to isolate the process chamber and maintain the temperature thereof when the pedestal is in the lowered position.

34. A method according to claim 30, wherein the apparatus further comprises a magnetically coupled repositioning system adapted to reposition the

carrier with the plurality of substrates held therein during thermal processing of the plurality of substrates, and wherein the method further comprises the step of magnetically coupling mechanical energy through the pedestal to the carrier to reposition the carrier during thermal processing of the plurality of substrates without use of a movable feedthrough into the process chamber, and substantially without moving the at least one of the plurality of heating elements in the pedestal.

a plurality of substrates held on a carrier within a process zone of a process chamber having a top wall, a side wall, and a bottom wall,

35. A method of reconfiguring an apparatus for thermally processing a plurality of substrates held on a carrier within a process zone of a process chamber defined by a process vessel and a base-plate, apparatus further including a first injector having at least one injector port positioned in a first position relative to the plurality of substrates held on the carrier through which a fluid is introduced to process the plurality of substrates, and a first liner separating the at least one injector and the carrier with the plurality of substrates held therein from the process vessel, the liner having at least one exhaust port positioned in a first position relative to the plurality of substrates held on the carrier, the method comprising steps of:

separating the process vessel and the base-plate;

removing the first injector from the process chamber;

removing the first liner from the process chamber;

installing a second liner having at least one exhaust port in the process chamber;

installing a second injector having at least one injector port in the process chamber; and

wherein the second injector and second liner have at least one injector port and exhaust port positioned in a different position relative to the plurality of substrates held on the carrier than the first injector and the first liner.

36. A method according to claim 35, wherein the first injector is integrally formed with the first liner, and wherein the step of removing the first injector from the process chamber also comprises the step of removing the first liner from the process chamber.

37. A method according to claim 35, wherein the second injector is integrally formed with the second liner, and wherein the step of installing the second injector in the process chamber also comprises the step of installing the second liner in the process chamber.

38. A method according to claim 35, wherein the steps of installing the second injector in the process chamber and installing the second liner in the process chamber, comprise the steps of steps of installing the second injector in the process chamber and installing the second liner in the process chamber to provide a flow pattern selected from the group consisting of:

up-flow;

down-flow; and

cross-flow.